

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
18 November 2004 (18.11.2004)

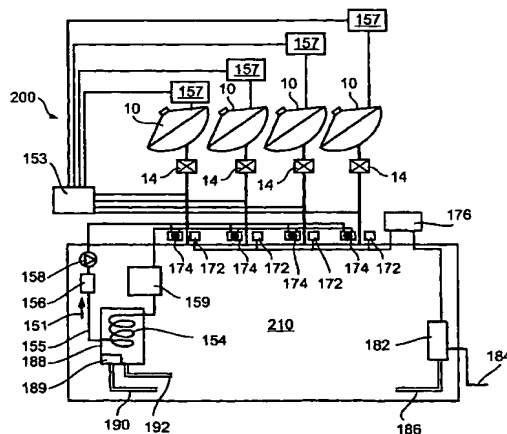
PCT

(10) International Publication Number
WO 2004/099682 A3

- (51) International Patent Classification⁷: **F24J 2/00**
- (21) International Application Number:
PCT/IL2004/000406
- (22) International Filing Date: 12 May 2004 (12.05.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
155876 12 May 2003 (12.05.2003) IL
- (71) Applicant (for all designated States except US): **RAMOT AT TEL AVIV UNIVERSITY LTD.** [IL/IL]; 32 Haim Levanon Street, 69 975 Tel Aviv (IL).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **KRIBUS, Abraham** [IL/IL]; 2 Smilanski Street, 76 447 Rechovot (IL). **LEVY, Nathan-Arie** [IL/IL]; 38 HaShchafim Street, 43 724 RaAnana (IL). **KAFTORI, Daniel** [IL/IL]; Moshav Alonei Abba, 36 005 Alonei Abba (IL).
- (74) Agent: **G.E. EHRLICH (1995) LTD.**; 11 Menachem Begin Street, 52 521 Ramat Gan (IL).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:
— with international search report

[Continued on next page]

(54) Title: SMALL-SCALE, CONCENTRATING, SOLAR CHP SYSTEM



(57) Abstract: A high-efficiency, small-scale, combined heat and power, concentrating solar energy system (200), designed specifically for residential and other relatively low-power applications, rendering it cost-effective and economically viable. Two-axis tracking of a dish-like reflector (10) of between 1 and 2 meters in aperture ensures very high concentrating ratios of between 200 and 8-suns or even higher. In consequence very high coolant outlet temperatures, of 120-180 degrees C may be reached at the outlet of the collector coolant, which may be oil, gas, or pressurized water. The high coolant temperatures are advantageous because they may be used for air-conditioning. The high concentration is advantageous because the efficiency of the photo voltaic cells is improved with higher concentration. The overall efficiency is greater than 60 %. Additionally, a simple but accurate drive, designed as a radio-dial drive (14), with substantially zero backlash, and substantially zero drive, is provided for driving the concentrating solar energy system. Preferably, two radio-dial drives are employed and tracking is performed along two axes, of an azimuth-elevation mount, a polar mount, or a cross mount.

WO 2004/099682 A3



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(88) Date of publication of the international search report:
10 March 2005

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL04/00406

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : F24J 2/00

US CL : 126/569

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 126/569

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EAST

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4,192,583 A (HORTON) 11 March 1980 (11.02.1980), column 8 lines 12-59.	1-69
Y	US 4,440,150 A (KAEHLER) 03 April 1984 (03.04.1984), column 5 lines 1-68.	1-69
Y	US 5,148,012 A (CARTER) 15 September 1992 (15.09.1992), column 4 lines 11-55.	1-69

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

27 October 2004 (27.10.2004)

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Date of mailing of the international search report

21 JAN 2005

Authorized officer

Stephen Gravina

Telephone No. 703 308 0975